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Tone and Earnings Persistence: Evidence from Interim Management Statements

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Abstract: This paper contributes to the earnings quality literature by examining the association between financial disclosure tone and earnings persistence. In particular, since prior literature documents that earnings persistence contains information for investor decision making and that the tone of financial disclosures is positively associated with future earnings, I argue that firms with greater earnings persistence are likely to have more positive tones. Using a sample of Interim Management Statements (IMSs) from 2008 till 2013, I provide evidence that, for non-technology firms with an annual profit, the tone increases with increasing persistence in annual earnings. However, for technology firms, I find no significant association between the tone and earnings persistence. I then replace the overall IMS tone with separate tonal measures for positive and negative statements. I find, for non-technology (technology) firms with an annual profit, that while the tone of negative (positive) statements is negatively (positively) associated with earnings persistence, the tone of positive (negative) statements has no significant association. Additionally, I find that the tone in loss firms has no significant association with earnings persistence. Overall, my study indicates a positive association between the IMS tone and earnings persistence in non-technology firms with an annual profit.
Keywords: Earnings Persistence, Tone, Textual Analysis, Financial Performance, Interim Management Statements.

1. Introduction

In recent years, the persistence of accounting earnings as an attribute of earnings quality has received growing attention from academics (Dechow, Ge, & Schrand, 2010; Sloan, 1996). An interesting subset of these studies focuses on the association between key linguistic features of a firm's financial disclosures and the persistence of its earnings, most notably by Li (2008) who examines the relationship between annual report readability and earnings persistence. Although the tone is a widely examined linguistic feature in financial disclosures (e.g. Henry, 2008; Henry & Leone, 2016; Loughran & McDonald, 2011, Tetlock, 2007), so far, no study has directly examined the association between the tone and earnings persistence. This paper contributes to the earnings quality literature by addressing this gap.

Tone is a measure of the sentiment of written narratives in a disclosure, and is often computed as the difference in the number of positive and negative statements or keywords identified in the disclosure (Henry & Leone, 2016; Rahman, Schleicher, & Walker, 2017). Prior studies indicate that the tone of disclosures such as annual reports and earnings press releases is useful for investor decision making (e.g. Davis, Piger, & Sedor, 2012; Kothari, Li, & Short, 2009; Li, 2010). A likely explanation for this, as advanced by Davis et al. (2012), is that as managers compare the costs and benefits of informative versus strategic disclosures, they conclude that on average, the benefits of informative disclosures outweigh the costs, for both good and bad earnings news. Consequently, prior research is consistent with the tone being positively associated with future earnings (Davis et al., 2012; Henry and Leone, 2016).

Earnings persistence, on the other hand, is described as the continuity of earnings from one accounting period to the next (Dechow et al., 2010; Hsu & Hu, 2016). Persistence is an important attribute of earnings quality because greater earnings persistence enables increased precision in estimating future earnings and firm equity value. In particular, the more persistent the stream of earnings in a firm, the more likely it is that current earnings is

useful to investors in determining future earnings (Dechow et al., 2010; Richardson, Sloan, Soliman, & Tuna, 2005; Sloan, 1996).

Given that greater earnings persistence provides more useful earnings information for investor decision making and that the tone of financial disclosures increases with increasing future earnings, I argue that firms with greater earnings persistence are likely to provide disclosures with more positive tones. Further, because managers, on average, provide informative disclosures on both good and bad earnings news, the tone of positive (negative) statements, otherwise known as the 'positivity' ('negativity'), is expected to be positively (negatively) associated with future earnings. Therefore, the positivity (negativity) is likely to be positively (negatively) associated with earnings persistence.

An exception to this aforementioned argument is a scenario when the tone of informative disclosures is not positively associated with future earnings. This can happen when companies deliberately operate at low profitability levels or incur losses in order to capture gigantic, short-lasting market opportunities (Baber, Fairfield, & Haggard, 1991; Bushee, 1998). Typically in the technology industry, these firms often invest heavily in R&D, have fast diffusion of innovations, recruit a high number of scientific and technical personnel, conduct expensive promotional campaigns and engage in organic expansion. Consequently, they may experience a planned level of poor earnings performance (Cooper & Selto, 1991; Seybert, 2010) while their tone is optimistic in anticipation of massive short-term profits in future. In these cases, the association between the tone and earnings persistence may be difficult to predict. Considering this caveat, I argue that my proposed positive (positive, negative) association between the tone (positivity, negativity) and earnings persistence is likely to be applicable, at the very least, to non-technology firms.

To examine the above propositions, I obtain 1038 Interim Management Statements (IMSs) from a random sample of 100 non-financial FTSE All-Share Index firms for the

period 2008 – 2013. An Interim Management Statement (IMS) is a trading update disclosed by firms operating in EU regulated markets, containing descriptions of their financial performance in the first and third quarters of the financial year. The firm retains considerable discretion over which line-item(s) to disclose. In effect, IMSs are de-facto voluntary disclosures with respect to content (Link, 2012; Schleicher & Walker, 2015). I obtain the IMSs from Perfect Information Navigator's database of public disclosures of listed UK and EU firms. Because IMSs contain narratives on financial performance, they are appropriate for measuring tone. Furthermore, most IMSs are between one and two pages in length, and hence are suitable for full document reading (Rahman et al., 2017).

I compute the tone in IMSs by performing full document manual textual analysis. The advantage of manual textual analysis is that it is 'meaning-oriented' – manual reading is likely to differentiate between contexts and meanings and can hence extract the sentiment from individual statements more reliably than computer-assisted word counts (Clatworthy & Jones, 2003; Schleicher & Walker, 2010). This is critical because prior studies using automated wordlists indicate that positive (negative) words may often be used in non-positive (non-negative) contexts (Loughran & McDonald, 2011; Rahman et al., 2017). Further, prior studies employing manual analysis usually show high levels of inter-coder reliability (e.g. Clatworthy & Jones, 2003; Schleicher & Walker, 2010), and therefore the concern of subjectivity in tone measurement is generally minimal (Rahman et al., 2017). I read each individual statement in an IMS and assign a tone to the statement, based on the sentiment conveyed. I define a statement as 'Positive' ('Negative') if it is favourable (unfavourable) to the firm's financial and economic well-being. I define a statement as 'Neutral' if it is neither distinctly positive nor negative, if it preserves the status-quo, or if it is unclear in tone. After assigning the tone to each statement, I compute the overall IMS tone score as the difference between the number of 'Positive' and 'Negative' statements identified in an IMS, scaled by

the sum of ‘Positive’ and ‘Negative’ statements. Additionally, I compute a measure of the sentiment conveyed by the positive (negative) statements only, by dividing the number of ‘Positive’ (‘Negative’) statements in an IMS by the sum of all ‘Positive’, ‘Negative’, and ‘Neutral’ statements. I refer to these as ‘positivity’ and ‘negativity’ respectively.

I begin my empirical analysis by estimating the effect of tone on earnings persistence one-year and two-year head. I initially follow the approach of Hsu and Hu (2016) and control my future annual earnings estimations with the IMS tone and current annual earnings only. I find that the IMS tone is positively associated with annual earnings persistence. I then replace the tone score with separate positivity and negativity measures and find that while the negativity is negatively associated with earnings persistence, there is no significant association between the positivity and earnings persistence. I segregate annual earnings into accruals and cash flow components and find that both these components have a positive (negative) association with tone (negativity) in predicting future earnings.

I subsequently repeat my estimations of the incremental effect of the IMS tone on earnings persistence one-year and two-year ahead but now also control my models for absolute total accruals to proxy accounting discretions for earnings management. I further control for return and earnings variability to account for business complexity and include other relevant firm characteristics based on Li (2008). I continue to find that the tone is positively associated with annual earnings persistence both one-year and two-year ahead. After replacing the tone with separate positivity and negativity measures, I still find that the negativity is negatively associated with earnings persistence one-year ahead while the positivity continues to demonstrate no significant association. When I distinguish between technology and non-technology firms, I find that the tone of non-technology firms is positively associated with earnings persistence one-year and two-year ahead. I also observe that the negativity of non-technology firms is negatively associated with earnings persistence

one-year ahead but the positivity has no significant association. In contrast, for technology firms, when controlled with firm characteristics and accounting discretions for earnings management, I find that the overall tone has no significant association with earnings persistence. However, the positivity in technology firms is positively associated with earnings persistence one-year and two-year ahead. Overall, my findings are consistent with the assertion that, at the very least, the tone of IMSs in non-technology firms increases with increasing annual earnings persistence.

Prior literature also indicates that losses are more transient in nature than profits (e.g. Hayn, 1995; Lawrence, Sloan & Sun, 2014; Sloan, 1996). This is because managers typically engage in active operating decisions to maximise and sustain profits and to avoid losses, while shareholders invest in firms with profit potentials and move away from firms that are likely to make losses (Lawrence et al, 2014). At the same time, conservative accounting principles ensure that losses are recognized more quickly than profits (Basu, 1997). Because profits are more persistent than losses, I now examine if there is a difference between profit firms and loss firms in terms of the association between tone and earnings persistence.

I find that the overall IMS tone is positively associated with the persistence of profits one-year and two-year ahead but has no definite association with the persistence of losses. When the tone is replaced with separate positivity and negativity measures, I find that the negativity is negatively associated with the persistence of profits one-year and two-year ahead while the positivity has no significant association. I continue to find that neither the positivity nor the negativity has any association with the persistence of losses. I subsequently separate technology firms from non-technology firms and find that, for one-year and two-year ahead earnings, the tone (negativity) of non-technology firms is positively (negatively) associated with the persistence of profits, while the positivity of technology firms is positively associated with the persistence of profits. I continue to find that the overall IMS

tone (positivity, negativity) has no significant association with the persistence of losses. In sum, my findings are consistent with the assertion that the positive (negative) association between the tone (negativity) and persistence of earnings is largely a characteristic of non-technology firms that make an annual profit. Robustness tests including changes in the model specifications and using the automated approach to measuring tone [the Henry (2008) lists of positive and negative keywords] produce qualitatively similar findings.

In this paper, I contribute to the literature on the relationship between a firm's earnings quality and the linguistic features of its financial disclosures. To the best of my knowledge, this is the first study that directly examines the association between the disclosure tone and earnings persistence. I provide empirical evidence that the tone of IMSs in non-technology firms with an annual profit is positively associated to annual earnings persistence while the tone of negative statements in these firms is negatively associated with earnings persistence. I further demonstrate that the tone is not associated with the persistence of losses.

The remainder of this paper is organized as follows. Section 2 provides the background on earnings persistence and the relationship between tone and earnings persistence. Section 3 describes the data and research design while Section 4 reports on the empirical findings on the association between tone and earnings persistence. Section 5 examines differences between profit and loss firms in the association of tone and earnings persistence. Section 6 outlines the robustness tests while Section 7 concludes.

2. Background

2.1 Earnings Persistence

Accounting earnings, generally computed as the difference between a firm's revenues and expenses for a period, is arguably the most important indicator of a firm's financial performance (Lev, 1983). Earnings persistence is the ability of earnings to continue or sustain

from one accounting period to the next, and is a key attribute of earnings quality (Dechow et al., 2010). For investors, high earnings quality implies that the reported earnings number is useful for investor decision making. The more persistent the streams of earnings in a firm, the more reliably current earnings can be used in estimating future earnings and firm equity value. Therefore, the greater the earnings persistence, the more decision useful the current earnings is (Dechow et al., 2010; Hsu & Hu, 2016; Richardson, Sloan, Soliman & Tuna, 2005; Sloan, 1996). The key factors affecting earnings persistence include earnings trends[2], earnings variability[3] and earnings management activities[4] (Dechow et al., 2010; Subramanyam, 1997).

Several prior studies focus on the share price consequences of earnings persistence. These studies suggest that greater earnings persistence leads to higher equity valuation and a stronger share price reaction (Collins & Kothari, 1989; Kormendi & Lipe, 1987). A few studies examine the effect of earnings persistence on employee compensation. This includes Baber, Kang and Kumar (1998) who find that the greater the earnings persistence, the more earnings-sensitive are the different components of employee compensation. Likewise, Nwaeze, Yang and Yin (2006) find that the compensation committee's decisions are affected by earnings persistence. Other papers examine the relationship between firm and managerial characteristics and earnings persistence. For example, Hsu and Hu (2016) examine the association between earnings persistence and the role that the Board of Directors play. They find that greater earnings persistence in firms is driven predominantly by the advisory role of the board and less by the monitoring role of the board. They conclude that earnings persistence is greater when

[2] Earnings trends imply identifiable patterns in earnings streams from historical data. Earnings trends are affected by income from continued and discontinued operations, the effect of changes in accounting principles, continuity in the nature of operations and product-mix, etc., all of which can influence earnings persistence (Subramanyam, 1997).

[3] The greater the variability in earnings streams, the less likely it is that earnings will persist from one period to another (Dechow et al., 2010; Lev, 1993).

[4] Earnings management implies changes in accounting methods or assumptions, and includes techniques such as big baths, write-downs, offsetting unusual gains or losses, and the timing of recognizing revenues and expenditures, all of which can also affect the continuity of earnings streams (Dechow, Sloan, & Sweeny, 1995; Huang, Teoh, & Zhang, 2014; Kimbrough & Wang, 2014; Subramanyam, 1997).

boards are dedicated to advising. A smaller subset of earnings quality studies investigates the relationship between the linguistic features of financial disclosures and earnings quality. One such example is Li (2008) who examines the association between earnings persistence and annual report readability. Li (2008) finds that disclosures that are easy to read have greater earnings persistence. My study extends the literature on the relationship between earnings persistence and the linguistic features of disclosures by examining if there is an association between the disclosure tone and earnings persistence.

2.2 Tone and Financial Performance

In the context of financial reporting, the word 'tone' implies sentiment (Henry, 2008; Henry & Leone, 2016; Loughran & McDonald, 2011; Rahman et al., 2017). Linguistic tone is the sentiment conveyed by written narratives. In accounting research, the tone indicates whether the performance of a firm as reported in financial disclosures is positive or negative (Hoskin, Hughes, & Ricks, 1986; Henry & Leone, 2016). The unit of tone measurement varies depending on the nature of the textual analysis applied. When manual analysis is employed, the unit of tone measurement is typically the number of textual sentences or statements. For automated analysis, the unit of tone measurement is usually the number of keywords from a predetermined wordlist. The net tone score is typically constructed as a difference between: (i) positivity—a measure of the extent of positive sentiment in a disclosure, typically computed as the proportion of statements or keywords in the disclosure identified as 'Positive', and (ii) negativity—a measure of the extent of negative sentiment in a disclosure, generally computed as the proportion of statements or keywords in the disclosure identified as 'Negative'. An overall positive (negative) tone in the disclosure typically implies favourable (unfavourable) financial performance. Previous studies indicate that the tone of financial disclosures such as interim and annual reports and earnings conference calls contain incremental information for

share prices (e.g. Francis, Schipper, & Vincent, 2002; Henry, 2008; Henry & Leone, 2016; Hoskin et al., 1986; Rahman et al., 2017; Tetlock, Saar-Tsechansky, & Macskassy, 2008).

Prior literature also documents a positive association between future earnings and the tone of annual reports, earnings press releases and trading statements (e.g. Davis et al., 2012; Demers & Vega, 2011; Li, 2010; Schliecher & Walker, 2010). This is because managers weighing up the costs and benefits of informative and strategic disclosures are likely to conclude that informative disclosures of both good and bad earnings news, on average, are more likely to benefit the preparers as well as users of financial disclosures and assist investors in improved decision making (Davis et al., 2012). Informative disclosures in this context imply statements that are truthful and decision relevant. For instance, managers are unlikely to provide easily refutable disclosures that can destroy their future credibility and prompt managerial and market penalties (Baginski, Hassell & Hillison, 2000). On the other hand, providing informative disclosures is likely to increase investor confidence, optimise capital allocation and reduce information asymmetry (Kimbrough & Wang, 2014).

2.3 Tone and Earnings Persistence

The underlying rationale for the association between the disclosure tone and earnings persistence is grounded on the decision usefulness of earnings (Hsu & Hu, 2016). The more persistent the stream of earnings in a firm, the more useful current earnings is likely to be in determining future earnings (Dechow et al., 2010). On the other hand, given that on average, managers provide informative disclosures on future earnings, the tone of financial disclosures is likely to be positively associated with future earnings (Davis et al., 2012; Li, 2010). Taken together, firms with greater earnings persistence are likely to have more positive disclosure tones.

The above rationale can also be applied to hypothesize the association of earnings persistence with the tone of positive and negative statements. Given that on average, managers provide informative disclosures on both good and bad earnings news, the number of positive (negative) statements, i.e. the positivity (negativity), is likely to be positively (negatively) associated with future earnings. The more persistent stream of earnings a company has, the more it is likely that the reported earnings number is a precise estimator of future earnings. Therefore, the positivity (negativity) is likely to be positively (negativity) associated with earnings persistence.

A possible exception to the above hypotheses is when the tone of informative disclosures is inconsistent with a firm's earnings performance. For instance, in order to capture gigantic but short-lasting market potentials, some firms may invest heavily in R&D, engage in organic expansion, launch massive promotional campaigns, hire a large number of scientific and technical staff, have high rotation of equipment and fast diffusion of prepared products and innovations, and thereby experience planned low profits or even losses (Baber et al., 1991; Bushee, 1998; Cooper & Selto, 1991). Hence the tone of informative disclosures can increase in anticipation for future profit growth despite seemingly unsatisfactory annual earnings. Given the nature of the business, technology firms are more likely to fit the above descriptions than firms in any other industry (Baginski et al., 2000; Seybert, 2010). Nonetheless, I argue that my proposed positive (positive, negative) association between earnings persistence and tone (positivity, negativity) is likely to be applicable, at the very least, to non-technology firms.

3. Methodology

3.1 Data and Sample Selection

The data in this study is based on Rahman et al. (2017) who use a sample of Interim Management Statements (IMSs) from non-financial FTSE All-Share Index firms during the

period 2008 – 2013. Interim Management Statements are quarterly updates of trading and operating performance, disclosed by firms listed in EU regulated markets (Schleicher & Walker, 2015). IMSs are substantially less extensive than US-style quarterly reports – they do not include full financial statements. Instead, they are almost entirely comprised of textual narratives with the firm retaining substantial control over which line-items to disclose, if any. In effect, the IMS disclosure requirements, as specified in Article 6 of the EU Transparency Directive (Directive 2004/109/EC), can be met by just providing a general description of the trading and financial performance. As such, the reported content in IMSs is de-facto voluntary. Firms disclose two IMSs per financial year, one in the first quarter and one in the third quarter (Link, 2012; Rahman et al., 2017). Although since its inception in 2007 the disclosure of IMSs was mandatory for EU listed firms, it has been made voluntary since 2014 (Schleicher & Walker, 2015). I use IMSs in this study because: (i) an IMS contains financial performance narratives and so it is an appropriate disclosure for measuring tone, and (ii) the relatively short length of the average IMS (less than two pages) facilitates full document manual reading.[5]

I adopt the sampling approach of Rahman et al. (2017). I define a firm-year by the calendar year where the majority of the months of the financial year fall. For firms with June year-ends, I allocate the calendar year of the June year-end to the financial year.[6] Panel A of Table 1 presents the firm sample. The starting point of the sample is the list of all 668 firms in the FTSE All-Share Index as at 30 June 2008. After eliminating 305 financial firms and an additional 39 firms disclosing fully-fledged quarterly reports due to US cross-listing, it leaves 324 non-financial FTSE All-Share Index firms, from which I randomly select 100 firms.

Panel B illustrates the IMS sample. I collect all IMSs disclosed by the sampled 100 non-financial firms during the period 2008 – 2013. I obtain these IMSs from the Perfect

[5] For instance, it takes for Rahman et al. (2017) only about 50 minutes to manually read and score one full IMS document.
[6] The approach of allocating financial years to calendar years for defining firm-years is also employed in Schleicher and Walker (2015).

Information Navigator database which archives financial disclosures and other public filings of listed UK and EU firms (Rahman et al., 2017). During the sampling period, IMSs were mandatory disclosures. Therefore, if each firm discloses the required number of two IMSs per financial year over my six-year sampling period, it yields a maximum of 1200 IMSs. I lose 69 IMSs because of firm collapse or delisting, and a maximum of another 109 IMSs which were not disclosed by firms because they failed to comply with the EU disclosure requirement. This potentially leaves a total of 1022 IMSs and Rahman et al. (2017) use this sample in their study. Subsequently, I obtain an additional 16 IMSs misclassified in the Perfect Information Navigator as 'AGM Statement', 'Trading Statement' or 'Production and Operating Updates'.[7] This yields a final tally of 1038 IMSs for textual analysis.

Panel C of Table 1 illustrates the year composition of the sample. I observe that the number of IMS observations in 2008 is lower than 2009, indicating lower rates of disclosure in the early years of the EU Transparency Directive, consistent with the observation of Schleicher and Walker (2015). However, there is a steady decline in the number of IMS observations from 2010 onwards, primarily due to firm delisting and collapse. Panel D of Table 1 illustrates the industry composition of the sample. Slightly over 8% of IMSs are disclosed by firms in the Technology industry, so about 92% of the IMS sample are from non-technology firms, the majority of which are from two industries—Industrials (27%) and Consumer Services (30%).

[Table 1 near here]

3.2 Textual Analysis and Tone Measurement

[7] In order to determine misclassification of IMSs I obtain from the Perfect Information Navigator all trading statements and other public press releases disclosed by the 100 firms in my sample during 2008 – 2013. A disclosure was determined as a misclassified IMS if an IMS was missing for the said firm in the first or third quarter in any of the sample years and if a non-regular trading statement or a press release was disclosed during the quarter that contained all the required information of an IMS (descriptions of financial performance and financial position for the quarter, material events and transactions, and outlook for future performance).

I employ manual textual analysis for measuring tone. Manual tone is likely to provide a more accurate measure of the sentiment than alternative approaches such as computer-assisted word counts because manual analysis is 'meaning-oriented' and is more likely to detect contextual differences in narratives (Clatworthy & Jones, 2003; Schleicher & Walker, 2010).[8] For instance, recent studies document that positive (negative) words are frequently used in neutral or negative (positive) contexts (e.g. Loughran & McDonald, 2011). Although manual analysis is time consuming, prior studies generally report high levels of inter-coder reliability (e.g. Clatworthy & Jones, 2003; Hoskin et al., 1986; Rahman et al., 2017; Schleicher & Walker, 2010). Further, the manual reader is able to identify which statements and / or pieces of information are the most important in describing a firm's financial performance.

For textual analysis, I follow the approach of Rahman et al. (2017), the relevant steps of which are now outlined. My unit of tone measurement is 'the statement'. I define a statement as a group of words containing information on a particular topic. I observe that most statements comprise of a single, complete textual sentence. Occasionally, a single textual sentence contains more than one statement if there it has more than one distinct piece of information. Rarely, I count multiple sentences as one statement if the exact same sentence is repeated in the IMS (e.g. same sentence as bullet points in the heading and subsequently inside the text).

After identifying every statement in an IMS, I classify the tone of each statement as 'Positive', 'Negative' or 'Neutral'. I classify the tone as 'Positive' if a statement contains information that is deemed favourable to the firm. For instance, I categorize the statement 'Profits in the quarter is likely to increase' as a *Positive* statement since it implies increase in a firm fundamental, i.e. profits. This in turn is expected to make the firm more attractive to potential investors and thereby increase the share price. I classify the tone as 'Negative' if the statement contains information that is deemed unfavourable to the firm. For instance, I identify

[8] Rahman et al. (2017) provide evidence that the tone measured by the manual approach yields greater explanatory power for short-window announcement period share price reaction than the tone measured by the two most widely used automated wordlists—Henry (2008) and Loughran and McDonald (2011).

the statement 'Trading conditions have weakened in the past few months' as a *Negative* statement since it describes an adverse trading condition and may lead to the decline of the financial bottom-line, thereby potentially dampening the share price. I classify the tone as 'Neutral' if: (i) the tone is neither distinctly positive nor negative, (ii) there are no changes in performance, (iii) the status-quo is preserved and (iv) the statement is unrelated to the firm's financial and economic well-being. For instance, I categorize the statement 'Sales performance next quarter is expected to be similar to the current quarter' as a *Neutral* statement since it indicates no changes in performance. After identifying the tone of every statement in an IMS, I then compute, for each IMS, the net tone score, TONE, as follows:

$$TONE = (POSITIVE_S - NEGATIVE_S) / (POSITIVE_S + NEGATIVE_S) \quad (1)$$

In Equation 1, $POSTIVE_S$ ($NEGATIVE_S$) refers to the total number of positive (negative) statements in the IMS. TONE is a continuous variable that ranges from totally negative (-1) to totally positive (1). If there are more negative (positive) statements than positive (negative) statements in an IMS, then TONE would range between -1 and 0 (0 and 1), indicating that the overall sentiment in IMS is 'Negative' ('Positive'). Absence of any negative (positive) statements would make the IMS tone 1 (-1). A net tone score of zero is recorded if the number of positive statements in the IMS is equal to the number of negative statements. This would indicate that the overall sentiment in the IMS is 'Neutral'.

I also compute, for each IMS, separate measures of positivity and negativity, termed POS and NEG respectively. I replace TONE with POS and NEG to examine the association between earnings persistence and the tone of positive and negative statements.[9] POS and NEG are computed as follows:

[9] Prior studies have often shown that the market response to positivity is different from that of negativity (e.g. Loughran & McDonald, 2011; Rahman et al., 2017; Tetlock, 2007). Further, Abrahamson and Amir (1996) indicate that disclosures are often sugar-coated with positive statements while Henry and Leone (2016) note that disclosures contain a disproportionately greater number of positive keywords.

$$POS = POSITIVE_S / TOTAL_S \quad (2)$$

$$NEG = NEGATIVE_S / TOTAL_S \quad (3)$$

In Equations 2 and 3, $TOTAL_S$ refers to the sum of all positive, negative and neutral statements identified in an IMS. By definition, POS and NEG range between 0 and 1. The higher the value of POS (NEG), the greater is the content of positive (negative) sentiment in an IMS, i.e. the positivity (negativity). The tone of the individual statements was classified prior to determining that it could be used in future earnings regressions.

3.3 Variables

The three tonal variables are TONE, POS and NEG, which represent the net tone score, positivity and negativity in the IMS respectively. Annual earnings is represented by the variable EARN, which is measured as the yearly earnings before extraordinary items. I use several variables to control for earnings trend, variability, earnings management activities and firm characteristics, based on Huang et al., (2014) and Li (2008; 2010). This includes the profitability status, LOSS, as a measure of company profitability and the annual buy-and-hold return, RET, as a measure of annual market return. A firm's dividend payment status, DIV, and book-to-market value of equity, BTM, are expected to capture growth opportunities and future investments. The absolute value of total accruals, ABSACC, is used as a measure of accounting discretion for earnings management. Share price return volatility, STDRET, and earnings volatility, STDEARN, are expected to capture operating and business risks of the firm. Firm age, AGE, is expected to capture differences in the life cycle of company. The number of business segments, BUSSEG, and geographic segments, GEOSEG, are included to capture operating complexity of the firm. HITECH is an indicator variable taking the value of 1 if the firm operates in the Technology Industry. All variables are defined in the Appendix.

4. Results

4.1 Descriptive Statistics and Correlations

In Panel A of Table 2, I present the descriptive statistics of the variables used in this study. TONE has positive mean and median values, consistent with prior literature that the average tone of financial disclosures is optimistic (e.g. Abrahamson & Amir, 1996; Henry & Leone, 2016; Rutherford, 2005). I observe that on average, about one in four statements in an IMS contain positive tone while approximately one in seven statements are negative in tone. My finding that the mean and median of POS are greater than NEG is consistent with this observation, since TONE is constructed as a difference between the number of positive and negative statements. The mean and median of EARN are also positive. The mean of RET is greater than its median, suggesting that a small number of firms have massive annual returns. About 14% of the IMSs in the sample are from loss-firms and 85% of the IMSs are disclosed by firms paying cash dividends during the year.[10]

In Panel B of Table 2, I present the correlations of each variable in the study with the three tone measures TONE, POS, NEG and the earnings measure, EARN. I observe that TONE is positively correlated with POS and negatively correlated with NEG, as expected. Both TONE and POS have positive correlations with EARN and RET, which indicates that the number of positive statements and the overall IMS tone increases with increasing profits and annual returns. This is consistent with Davis et al.'s (2012) suggestion that the tone provides informative disclosures about firm performance. Likewise, NEG is negatively correlated with RET, implying that the number of negative statements increases with decreasing annual returns. TONE and POS are also positively correlated with SIZE, consistent with unreported correlations showing a negative correlation between SIZE and LOSS—larger firms in the

[10] It appears that ABSACC, STDRET and STDEARN each contain an outlier value on the right hand side. However, I retain all observations since I do not wish to lose the full document manual tone scores from textual analysis. The results are qualitatively similar if these observations are deleted.

sample are more profitable. In addition, TONE and POS are negatively correlated with: (i) LOSS, suggesting that loss firms have more a pessimistic tone and fewer positive statements than other firms and (ii) BTM, indicating that firms with very low growth potential have a lower tone and fewer positive statements than other firms.

I find that EARN is positively correlated with RET which suggests that the annual buy-and-hold return increases with increasing profits. Additionally, SIZE, BUSSEG and DIV are all positively correlated with EARN, consistent with the notion that firms that are larger in size, have more business segments or pay annual dividends have higher earnings. In contrast, EARN is negatively correlated with BTM and LOSS both, indicative of firms with low growth potentials and firms that incur losses having lower profits. ABSACC is positively correlated with EARN, which implies that an increase in accounting discretion for earnings management is associated with increased earnings. Finally, HITECH is negatively correlated with EARN, suggesting that technology firms are likely to have lower profits than other firms.

[Table 2 near here]

4.2 The Association between Tone and Earnings Persistence: Basic Models

I first follow the approach of Hsu and Hu (2016) to examine the effect of tone on earnings persistence by developing the following basic model (excluding year fixed-effects[11]):

$$EARN_{it+nj} = \alpha + \beta_1 TONE_{itj} + \beta_2 EARN_{itj} + \beta_3 (TONE_{itj} \times EARN_{itj}) + \varepsilon_{itj} \quad (4a)$$

$$EARN_{it+nj} = \alpha + \beta_1 TONE_{itj} + \beta_2 EARN_{itj} + \beta_3 (TONE_{itj} \times EARN_{itj}) + \beta_4 (TONE_{itj} \times EARN_{itj} \times HITECH_{itj}) + \beta_5 (TONE_{itj} \times HITECH_{itj}) + \beta_6 HITECH_{itj} + \beta_7 (HITECH_{itj} \times EARN_{itj}) + \varepsilon_{itj} \quad (4b)$$

[11] Each of the regressions include five year-dummy variables (YEAR FE), omitting the dummy variable for the year 2008. The results are qualitatively similar if no year-dummy variables are included.

where n = 1 or 2.

The main variable of interest in Equation 4 is the interaction term TONE × EARN, which implies the incremental effect of the IMS tone on the persistence of annual earnings. For the regression estimates, I standardize TONE to have a mean of 0 and standard deviation of 1 in order to facilitate comparing the economic significance of TONE across models. Equation 4a does not differentiate between technology and non-technology firms whereas Equation 4b includes separate interaction terms for the effect of tone on the persistence of earnings in technology firms. I only examine the effects for years t+1 and t+2 because my textual analysis reveals that IMSs rarely contain earnings guidance beyond two years into the future, with the vast majority of predictions for the year t+1. Equation 4 is presented in Panel A of Table 3.

Columns (1) and (2) of Panel A in Table 3 report the regressions for Equation 4a. I observe that the coefficient of TONE × EARN predicts positive annual earnings one-year and two-year ahead. This indicates that as the IMS tone goes up, the persistence of earnings increases in years t+1 and t+2 both. Columns (3) and (4) of Panel A in Table 3 present the regression estimations of Equation 4b. In these regressions, the coefficient of TONE × EARN indicates the incremental effect of tone on earnings persistence in non-technology firms while the coefficient of TONE × EARN × HITECH represents the incremental effect of tone on earnings persistence in technology firms. The positive coefficient of TONE × EARN continues to indicate that as the tone goes up in non-technology firms, the persistence of earnings increases in years t+1 and t+2 both. In contrast, the negative coefficient of TONE × EARN × HITECH in year t+1 indicates that as the tone in technology firms increase, earnings persistence decreases.

I next examine the effect of separate IMS positivity and negativity measures on earnings persistence by devising the following basic model (excluding year fixed-effects):

$$EARN_{it+nj} = \alpha + \beta_1 POS_{itj} + \beta_2 NEG_{itj} + \beta_3 EARN_{itj} + \beta_4 (POS_{itj} \times EARN_{itj}) + \beta_5 (NEG_{itj} \times EARN_{itj}) + \varepsilon_{itj} \quad (5a)$$

$$EARN_{it+nj} = \alpha + \beta_1 POS_{itj} + \beta_2 NEG_{itj} + \beta_3 EARN_{itj} + \beta_4 (POS_{itj} \times EARN_{itj}) + \beta_5 (NEG_{itj} \times EARN_{itj}) + \beta_6 (POS_{itj} \times EARN_{itj} \times HITECH_{itj}) + \beta_7 (NEG_{itj} \times EARN_{itj} \times HITECH_{itj}) + \beta_8 (POS_{itj} \times HITECH_{itj}) + \beta_9 (NEG_{itj} \times HITECH_{itj}) + \beta_{10} HITECH_{itj} + \beta_{11} (HITECH_{itj} \times EARN_{itj}) + \varepsilon_{itj} \quad (5b)$$

where n = 1 or 2.

The main variables of interest in Equation 5 are POS × EARN and NEG × EARN, which implies the effect of IMS positivity and negativity on the persistence of earnings respectively. POS and NEG are also standardized to have a mean of 0 and standard deviation of 1.

The results of Equation 5 are presented in Panel B of Table 3. In Columns (5) and (6), where I do not distinguish between technology and non-technology firms, I find that the IMS positivity has no effect on the persistence of annual earnings. However, as the IMS negativity increases, the persistence of earnings decreases in years t+1 and t+2 both. In Columns (7) and (8), which reports the regressions of Equation 5b, I find, for non-technology firms, that the positivity has no association with the persistence of earnings, while as negativity increases, the persistence of earnings continues to decrease in years t+1 and t+2 both. For technology firms, I find that both the positivity and negativity are associated with greater earnings persistence in year t+1. Further, the negative coefficients of POS × HITECH in years t+1 and t+2 implies that the positivity in technology firms predicts lower future earnings than in non-technology firms. Overall, the evidence in Table 3 suggests that for non-technology firms, the association between the IMS tone (negativity) and earnings persistence is positive (negative). However, this evidence is not applicable to technology firms.

[Table 3 near here]

4.3 Regression of Future Earnings on Current Cash Flow and Accruals Components

Since earnings comprises of cash flow and accruals components, it is interesting to examine whether the effect of the IMS tone on the cash flow component manifests differently from the accruals component. Accruals are generally less reliable than cash flows (Sloan, 1996). The cash flow component of current earnings is likely to provide a more precise estimate of the future earnings than the accruals component because of greater uncertainty involved in a firm's expectations of future receipts and payments. Therefore, in the case of technology firms where the tone may not necessarily reflect the year-end earnings, it is possible that the effect of the tone is smaller in magnitude for cash flows than for accruals.

I obtain cash flow from operations (CFO) and calculate total accruals (ACC) by deducting cash flow from operations from income before extraordinary items, both scaled by beginning total assets. Subsequently, I devise the following regressions:

$$EARN_{it+nj} = \alpha + \beta_1 TONE_{itj} + \beta_2 CFO_{itj} + \beta_3 (TONE_{itj} \times CFO_{itj}) + \beta_4 ACC_{itj} + \beta_5 (TONE_{itj} \times ACC_{itj}) + \varepsilon_{itj} \quad (6a)$$

$$EARN_{it+nj} = \alpha + \beta_1 TONE_{itj} + \beta_2 CFO_{itj} + \beta_3 (TONE_{itj} \times CFO_{itj}) + \beta_4 (TONE_{itj} \times CFO_{itj} \times HITECH_{itj}) + \beta_5 ACC_{itj} + \beta_6 (TONE_{itj} \times ACC_{itj}) + \beta_7 (TONE_{itj} \times ACC_{itj} \times HITECH_{itj}) + \beta_8 (TONE_{itj} \times HITECH_{itj}) + \beta_9 HITECH_{itj} + \beta_{10} (HITECH_{itj} \times CFO_{itj}) + \beta_{11} (HITECH_{itj} \times ACC_{itj}) + \varepsilon_{itj} \quad (6b)$$

where n = 1 or 2.

The results of regression estimations in Equation 6 are presented in Table 4. I first find that the interaction terms between the IMS tone and both the cash flow and accrual components predict positive future earnings in years t+1 and t+2 both, for all firms in Columns (1) and (2) and for non-technology firms in Columns (3) and (4). This indicates that the positive association between the tone and earnings persistence manifests in both the cash flow and accrual components of earnings. The magnitudes of the tone interaction terms with cash flow and accrual components are indistinguishable from each other in year t+1, although in both cases the magnitude of the accruals interaction terms are slightly larger in year t+2. For technology firms, the tone interaction terms are negative for both the cash flow and accruals components in year t+1, although the magnitude of the accruals interaction term is 2.7 times larger than the cash flow interaction term, and is also negative in year t+2.

[Table 4 near here]

I further estimate the following regressions to examine any differences between in the effect of the IMS positivity and negativity on the cash flow and accruals components in predicting future earnings:

$$EARN_{it+nj} = \alpha + \beta_1 POS_{itj} + \beta_2 NEG_{itj} + \beta_3 CFO_{itj} + \beta_4 (POS_{itj} \times CFO_{itj}) + \beta_5 (NEG_{itj} \times CFO_{itj}) + \beta_6 ACC_{itj} + \beta_7 (POS_{itj} \times ACC_{itj}) + \beta_8 (NEG_{itj} \times ACC_{itj}) + \varepsilon_{itj} \quad (7a)$$

$$EARN_{it+nj} = \alpha + \beta_1 POS_{itj} + \beta_2 NEG_{itj} + \beta_3 CFO_{itj} + \beta_4 (POS_{itj} \times CFO_{itj}) + \beta_5 (NEG_{itj} \times CFO_{itj}) + \beta_6 (POS_{itj} \times CFO_{itj} \times HITECH_{itj}) + \beta_7 (NEG_{itj} \times CFO_{itj} \times HITECH_{itj}) + \beta_8 ACC_{itj} + \beta_9 (POS_{itj} \times ACC_{itj}) + \beta_{10} (NEG_{itj} \times ACC_{itj}) + \beta_{11} (POS_{itj} \times ACC_{itj} \times HITECH_{itj}) + \beta_{12} (NEG_{itj} \times ACC_{itj} \times HITECH_{itj}) + \beta_{13} (POS_{itj} \times HITECH_{itj}) + \beta_{14} (NEG_{itj} \times HITECH_{itj}) + \beta_{15} HITECH_{itj} + \beta_{16} (HITECH_{itj} \times CFO_{itj}) + \beta_{17} (HITECH_{itj} \times ACC_{itj}) + \varepsilon_{itj} \quad (7b)$$

where n = 1 or 2.

The regression results from Equation 7 are presented in Table 5. The results indicate, for all firms in Columns (1) and (2) and for non-technology firms in Columns (3) and (4), that the negative association between the negativity and earnings persistence in Table 3 manifests in both the cash flow and accruals components in predicting future earnings, while the positivity continues to have no significant effect on either the cash flow or accrual components. In year t+1, I observe that the magnitude of the cash flow interaction terms with the negativity is either very similar to, or slightly larger than the corresponding accruals interaction terms, for all firms as well as for non-technology firms. This is consistent with the suggestion that when the tone is more directly reflective of the earnings performance, the magnitudes of the interaction terms between the tone measures and the more reliable of the earnings components, i.e. cash flow, are larger.

For technology firms, the interaction terms between the positivity (and the negativity) with the cash flow as well as the accrual components predict positive future earnings in years t+1 and t+2 both. In the case of both the positivity and negativity, the interaction terms are between 2.5 to 3 times larger in magnitude for the accrual components than the corresponding cash flow components. This suggests when the tone is less reflective of the earnings performance, the manifestation of the accruals component for predicting future performance is larger than the cash flow component.

[Table 5 near here]

4.4 Regression of Future Earnings on Tone and Current Earnings

I now introduce the following control variables in my regression estimations: ABSACC, SIZE, BTM, RET, STDRET, STDEARN, AGE, BUSSEG, GEOSEG and DIV based on Li (2008). I examine the predictive ability of my three tone measures and current earnings for one-year and two-year ahead earnings. Given that managers on average are likely to provide informative disclosures about future earnings, I expect TONE (POS, NEG) to predict positive (positive, negative) one-year and two-year ahead earnings.

I devise the following regressions of one-year and two-year ahead earnings EARN on TONE, and subsequently replace TONE with POS and NEG (excluding year fixed-effects):

$$EARN_{it+nj} = \alpha + \beta_1 TONE_{itj} + \beta_2 EARN_{itj} + \beta_3 HITECH_{itj} + \beta_4 ABSACC_{itj} + \beta_5 SIZE_{itj} + \beta_6 BTM_{itj} + \beta_7 RET_{itj} + \beta_8 STDRET_{itj} + \beta_9 STDEARN_{itj} + \beta_{10} AGE_{itj} + \beta_{11} BUSSEG_{itj} + \beta_{12} GEOSEG_{itj} + \beta_{13} DIV_{itj} + \varepsilon_{itj} \quad (8a)$$

$$EARN_{it+nj} = \alpha + \beta_1 POS_{itj} + \beta_1 NEG_{itj} + \beta_3 EARN_{itj} + \beta_4 HITECH_{itj} + \beta_5 ABSACC_{itj} + \beta_6 SIZE_{itj} + \beta_7 BTM_{itj} + \beta_8 RET_{itj} + \beta_9 STDRET_{itj} + \beta_{10} STDEARN_{itj} + \beta_{11} AGE_{itj} + \beta_{12} BUSSEG_{itj} + \beta_{13} GEOSEG_{itj} + \beta_{14} DIV_{itj} + \varepsilon_{itj} \quad (8b)$$

where n = 1 or 2.

The regression estimates in Equation 8 are reported in Table 6. In Columns (1) and (2) of Table 6, I observe that TONE is positively associated with both one-year and two-year ahead earnings although its ability to predict one-year ahead earnings is stronger, presumably because the overwhelming majority of forward-looking statements in IMSs do not make predictions beyond the year t+1. This is consistent with the prior literature and suggests that disclosure tone, on average, provides useful information on future earnings (Davis et al., 2012; Demers & Vega, 2011; Li, 2010). As expected, current earnings have strong positive associations with future earnings. In Columns (3) and (4) of Table 6, I replace TONE with POS

and NEG. I now find that NEG predicts negative one-year ahead earnings. There is some weak indication that POS predicts positive two-year ahead earnings. Importantly, all statistically significant negativity (positivity) coefficients predict negative (positive) future earnings, indicating that, on average, managers provide useful information about future performance.

As for the control variables, I observe that the coefficient of DIV is positive, which suggests that dividend-paying firms have higher one-year and two-year ahead earnings than non-dividend paying firms. This is consistent with the notion that firms expecting to generate profits are more likely to pay dividends. Also, there is some indication that the absolute value of accruals predicts positive one-year ahead earnings, consistent with the suggestion that earnings management activities, if any, are usually designed to generate an upward pressure on future earnings. I also observe that as TONE is replaced by POS and NEG, the explanatory power of the models remain almost identical for both the years t+1 and t+2, indicating that using separate measures for positivity and negativity is a decent alternative to the net tone score for examining the predictive ability of future earnings.

[Table 6 near here]

4.5 Examining the Association between Tone and Earnings Persistence: Full Models

The regressions from the basic models in Equations 4 and 5 indicate that greater the IMS tone score, the more it is likely that annual earnings persistence will go up, at the least, for non-technology firms. I now examine the incremental effect of the tone on earnings persistence by repeating the regression estimations of Equations 4 and 5 with the following control variables added in the models: ABSACC, SIZE, BTM, RET, STDRET, STDEARN, AGE, BUSSEG, GEOSEG and DIV, as well as the interaction terms between each of these variables

and EARN. The regression estimations for the models of Equation 4a and 4b, including the control variables and their EARN interaction terms, are presented in Table 7.

In Table 7, Columns (1) and (2) present the full regression model of Equation 4a. The coefficients of TONE × EARN continues to predicts positive earnings one-year and two-year ahead. Columns (3) and (4) of Table 7 present the full regression Equation 4b. I continue to find that as the tone of IMSs in non-technology firms goes up, the persistence of annual earnings increases. However, for technology firms, the tone no longer has a significant association with earnings persistence. I observe that the coefficient of TONE × HITECH is negative, which suggests that the tone in technology firms predicts lower future earnings than in non-technology firms. The incremental effect of tone on earnings persistence for all firms (non-technology firms) is 5% (4.8%) in year t+1 and 4.9% (4.5%) in year t+2. To gauge the economic significance of this finding, a one standard deviation increase in TONE (0.43) implies an increase in the persistence of earnings for all firms (non-technology firms) by 2.15% (2.06%) in year t+1 and by 2.09% (1.92%) in year t+2. An increase in the interquartile range of TONE (0.54 – 0.00, unreported) for all firms (non-technology firms) implies an increase in the persistence of earnings by 2.71% (2.58%) in year t+1 and by 2.64% (2.41%) in year t+2.

The remaining variables and interaction terms in Table 7 all depict expected characteristics. For instance, I observe that the coefficient of ABSACC × EARN is negative in year t+2, suggesting that earnings persistence decreases with the increase in absolute total accruals, consistent with previous literature on earnings persistence (e.g. Li, 2008; Sloan 1996). Also, the coefficient of RET × EARN is positive in year t+1 which indicates that as annual return increases, earnings persistence increases. This is consistent with the positive correlation between RET and EARN in Table 2, and indicates that earnings performance is reflected in annual share price changes. Finally, I find that the persistence of earnings decreases with the

number of business segments BUSSEG. It is possible that the similarity in earnings streams is reduced as more different types of businesses are in operation.

[Table 7 near here]

The results of Equation 5 are presented in Table 8. In Columns (1) and (2), which report the regression estimations of Equation 5a, I find that the positivity still has no effect on earnings persistence. As the negativity increases, the persistence of earnings continues to decrease in year t+1 but the significant negative effect in year t+2 from Panel B in Table 3 now disappears. The incremental effect of negativity on earnings persistence in year t+1 is –7.87%. A one standard deviation (interquartile range) increase in NEG (0.10, 0.20 – 0.06 (unreported)) implies that earnings persistence will decrease in year t+1 by 0.07% (1.10%).

In Columns (3) and (4) of Table 8, I find, for non-technology firms, that the positivity still has no association with earnings persistence. However, as the negativity increases, earnings persistence now decreases in year t+1 only. The incremental effect of negativity on earnings persistence for non-technology firms is –7.81% in year t+1. This implies that, for non-technology firms, an increase in NEG by one standard deviation (interquartile range) implies that earnings persistence will decrease in year t+1 by 0.08% (1.09%). For technology firms, unlike the results of Panel B of Table 3, I find that the negativity is no longer associated with earnings persistence. However, the positivity is associated with an increase in earnings persistence in year t+1 by 18.88% and in year t+2 by 19.67%. This means that, for technology firms, a one standard deviation (interquartile range) increase in POS (0.14, 0.33 – 0.13 (unreported)) implies an increase in earnings persistence by 2.64% (3.78%) in year t+1 and 2.75% (3.93%) in year t+2.

The coefficients of the remaining variables are similar to Table 7. The negative coefficient of POS × HITECH implies that the positivity in technology firms predicts lower future earnings than in non-technology firms. I continue to find that ABSACC is negatively associated with earnings persistence in year t+2, consistent with Sloan (1996) while RET is positively associated with earnings persistence in year t+1. Also, I observe that BUSSEG is negatively associated with earnings persistence in years t+1 and t+2.

[Table 8 near here]

Overall, the results in Tables 7 and 8 indicate at the very least, for non-technology firms, that the IMS tone is associated with an increase in earnings persistence one-year and two-year ahead while the negativity is associated with a decrease in earnings persistence one-year ahead. For technology firms, while the overall tone and negativity are no longer associated with the annual earnings persistence after inclusion of the control variables, the positivity is still associated with an increase in earnings persistence one-year and two-year ahead.

5. The Association between Tone and the Persistence of Profits and Losses

In my empirical analysis so far, I do not distinguish between profit and loss firms. However, prior literature is consistent with the notion that losses are less persistent than profits (Basu, 1997; Hayn, 1995; Lawrence et al., 2014; Sloan, 1996). Several explanations have been advanced for this. First, managers make active operating decisions to improve and sustain profitability and to avoid losses, making profits more sustained than losses (Branch, 1980). Second, investors are likely to move away from loss making businesses and invest more in businesses with sustained profits causing losses to persist less than profits (Brooks &

Buckmaster, 1976; Jacobsen, 1980). Third, in the extreme event when profits are not forseen, shareholders can liquate the firm and prevent indefinite consequences of losses (Hayn, 1995). Finally, losses are reflected in earnings more quickly than profits due to conservative accounting principles (Basu, 1997). Because of all of the above reasons, losses are less persistent than profits (Lawrence et al., 2014).

My results thus far indicate that the IMS tone is positively associated with annual earnings persistence. Because profits persist longer than losses, it is interesting to examine whether the association between tone and earnings persistence differs between profit and loss firms. I hence divide my sample into profit firms and loss firms based on the indicator variable LOSS which takes the value of 1 if EARN < 0 (i.e. 'loss firm'), and zero otherwise. I find that 895 IMSs in my sample are disclosed by firms with an annual profit and 143 IMSs by firms with an annual loss. I then estimate the regression estimations in Equation 4, with control variables added.

In Panel A of Table 9, I report the regression results of Equation 4a separately for profit firms and loss firms. The control variables and their interaction terms with EARN are unreported for brevity. Overall, the results in Table 9 imply that the positive association between the tone and earning persistence reported in Table 7 seems to be largely a characteristic of profit firms. There is no clear indication that the IMS tone is associated with the persistence of losses, although the tone is positively associated with the persistence of profits in years t+1 and t+2 both. The coefficient of HITECH × EARN for loss firms in the year t+2 provides some weak indication that losses are more persistent in technology firms than non-technology firms. This is not inconsistent with the argument(s) that losses are more likely to persist for longer periods if they are planned and that technology firms are more likely to operate at planned levels of losses than non-technology firms.

In Panel B of Table 9, I report the regression results of Equation 4b for profit firms and loss firms separately. For both technology and non-technology firms, I find that the tone has no significant association with the persistence of losses. In the years t+1 and t+2 both, the coefficients of TONE × EARN × HITECH are negative but insignificant. For non-technology firms, I find that the tone is positively associated with the persistence of profits in years t+1 and t+2 both. For technology firms, the coefficient of TONE × EARN × HITECH is positive in year t+2. A one standard deviation (interquartile range) increase in TONE would make profits in technology firms more persistent by 4.46% (5.61%) in year t+2, which is 3.09 times larger in economic terms than that of non-technology firms, perhaps owing to the proclivity of such firms for high profit growth. This also indicates why technology firms might be willing to operate at losses or low profitability for planned periods. The negative coefficients of TONE × HITECH for profit firms in years t+1 and t+2 both indicate that the tone predicts lower future profits for technology than non-technology firms, consistent with the suggestion that technology firms often operate at low levels of profitability.

The unreported control variables and interaction terms in Panels A and B of Table 9 are similar to each other. In both cases, while ABSACC is negatively associated with the persistence of profits in years t+1 and t+2 both and RET is positively associated with the persistence of profits in year t+1 only, neither of these variables are associated with the persistence of losses. Further, I find that BUSSEG is negatively associated with the persistence of profits but positively associated with the persistence of losses, consistent with the suggestion that the more different types of businesses are operated by the firm, the lesser the similarity is in the firm's earnings streams. The unreported results also indicate that STDEARN and STDRET are negatively associated with the persistence of losses in year t+2. In other words, the greater the earnings and return volatility, the more transient are the losses.

[Table 9 near here]

Subsequently, I estimate the full-model regressions of Equation 5 separately for profit firms and loss firms. In Table 10, the regression estimation in Equation 5a is reported in Panel A while the regression in Equation 5b is reported in Panel B. Consistent with the results in Table 9, I observe in Panel A of Table 10 that neither positivity nor negativity is associated with the persistence of losses. I find that although the positivity is not associated with the persistence of profits, if the negativity goes up, the persistence of profits decreases by 8.04% in year t+1 and 6.54% in year t+2. This is consistent with the results in Table 8.

In Panel B of Table 10, for non-technology firms, I report that while the positivity is not associated with the persistence of profits, the negativity is associated with a decrease in the persistence of profits by 8.07% in year t+1 and by 6.32% in year t+2. For technology firms, I find that the negativity is not associated with the persistence of profits although the positivity is associated with an increase in the persistence of profits by 15.18% in year t+1 and 13.01% in year t+2. Further, I observe that the positivity in technology firms predicts lower future profits than in non-technology firms. I continue to find that neither positivity nor negativity is associated with the persistence of losses. The unreported control variables and their EARN interaction terms in Table 10 are similar to Table 9. In the year t+1, ABSACC is associated with a decrease, while RET is associated with an increase in the persistence of profits. BUSSEG is associated with a decrease in the persistence of profits and an increase in the persistence of losses in the years t+1 and t+2 both. Further, in the year t+2, STDRET and STDEARN are both associated with a decrease in the persistence of losses.

[Table 10 near here]

The findings in Tables 9 and 10 indicate that the IMS tone, positivity and negativity are not significantly associated with the persistence of losses. Moreover, the positive (negative) association between the overall tone (negativity) and earnings persistence as reported for the full sample results in Tables 7 and 8 appear to be driven in a large part by non-technology firms with an annual profit.

6. Robustness Tests

6.1 Automated Word Lists

Arguably, subjectivity in tone measurement is a potential concern with manual textual analysis. However, due to their inability to capture differences in meaning and context, automated wordlists typically require large samples to reliably demonstrate trends and patterns of association between variables. Nevertheless, prior studies suggest that the Henry (2008) wordlist is likely to yield more reliable tone measurements than non-business domain specific wordlists such as Diction and General Inquirer (Henry & Leone, 2016).

To ensure that my results are generalizable, I now repeat the tests in Tables 3 – 10 with the Henry (2008) list of positive and negative keywords. With and without the control variables and their EARN interaction terms, I find, for the full sample and for non-technology firms, that TONE is positively associated with one-year ($p<0.05$) and two-year ahead earnings ($p<0.10$) and NEG negatively associated with one-year ahead earnings ($p<0.10$) while there is no association between POS and future earnings. For technology firms, when the control variables are excluded, I find that TONE (POS, NEG) is negatively (positively, positively) associated with earnings persistence in year t+1 ($p<0.10$ in all cases) but this effect disappears when control variables are added. I separate profit firms from loss firms and find that TONE is positively associated with the persistence of profits for one-year ahead earnings ($p<0.10$) and the results hold for non-technology firms when separated from

technology firms. Further, for non-technology firms, I find that NEG is negatively associated with the persistence of profits ($p<0.05$) but POS still has no significant association. For technology firms, I find that POS is positively associated with the persistence of profits in years t+1 ($p<0.05$) and t+2 ($p<0.10$) but neither TONE nor NEG has any significant association. I continue to find that TONE is not associated with the persistence of losses. Overall, my results with Henry (2008) wordlists are sometimes weaker in statistical significance but qualitatively consistent with the manual tone results in Tables 3 – 10.

6.2 Changes in Model Specification and Clustering of Standard Errors

I perform a number of robustness tests to ensure that my results are not limited to specific variable definitions. These include: (i) re-estimating the regressions using raw unstandardized TONE, POS and NEG scores (ii) re-estimating regressions by measuring TONE as POS – NEG as suggested by Loughran and McDonald (2011) instead of the tone measurement formula in Equation 1 (iii) replacing HITECH with eight separate industry classification dummy variables (omitting 'Oil and Gas'), based on ICB classification (iv) replacing reported robust standard errors clustered two-way on industry and year with one-way clustering at the: (a) year-level (b) industry-level and (c) firm-level. For the estimations in Equation 4a, I continue to find that TONE is positively associated with the earnings persistence in years t+1 and t+2 both, with and without the control variables and their interaction terms with EARN. When I cluster the robust standard errors at the firm-level, I find that TONE is positively associated with the persistence of earnings in year t+1 ($p<0.10$) but is not significant at the 10% level for year t+2. In the robustness tests involving Equation 4b, I continue to find that the tone of non-technology firms is positively associated with earnings persistence, at least for year t+1 in all the robustness tests, while the tone of technology firms is not associated with earnings persistence. I repeat the robustness tests for the estimations in Equation 5 and continue

to find that in all cases, NEG is negatively associated with the persistence of earnings for at least year t+1. Additionally, I find that POS still has no significant association with the persistence of earnings. The results are also qualitatively similar to the findings of Table 8 when separate interaction terms are used for earnings persistence in technology and non-technology firms. Clustering robust standard errors at the firm-level continue to show a negative association between NEG and earnings persistence in year t+1 ($p<0.10$) but is no longer significant for year t+2.

Subsequently, I repeat the robustness tests for the regression estimations in Tables 9 – 10 and find qualitatively similar results to the estimates reported. I find, for non-technology firms, that TONE (NEG) is positively (negatively) associated with the persistence of profits in year t+1 ($p<0.10$). However, NEG has no significant association with persistence of profits in year t+2. In all cases, the robustness tests indicate no specific association between either of tone, positivity, or negativity with the persistence of losses. I continue to find that TONE in non-technology firms is positively associated with the persistence of profits, except for clustering the standard errors at the firm-level, when it fails to be statistically significant at the 10% level. Although NEG in non-technology firms is negatively associated with the persistence of profits, I find no association between positivity and the persistence of profits. The robustness tests also indicate a positive association between positivity and the persistence of profits in technology firms. Importantly, none of the robustness tests are contradictory to the results presented in Tables 3 – 10.

7. Conclusion

In this study, I contribute to the literature on earnings quality by examining the association between the disclosure tone and earnings persistence. I find that as the tone in IMSs goes up, the persistence of annual earnings increases. This finding is applicable, at the

very least, to non-technology firms. When the tone is replaced with separate positivity and negativity measures, I find that the negativity in non-technology firms is negatively associated with earnings persistence while the positivity has no significant association. For technology firms, I find that the positivity is positively associated with earnings persistence. I find that both the cash and accrual components of earnings have similar manifestations with tone in predicting future earnings, although for non-technology firms, the magnitude of the effect of tone on the accrual component's predictability of future earnings is larger than the corresponding cash component. I subsequently separate profit firms from loss firms and find that tone is not associated with the persistence of losses. However, in non-technology firms, the tone (negativity) continues to be positively (negatively) associated with the persistence of profits. Overall, this study contributes to the literature on tone and earnings quality by providing evidence that the IMS tone in non-technology firms that make an annual profit is positively associated with the persistence of earnings.

There are some avenues for further research. First, the literature on the relationship between linguistic features of disclosures and earnings quality can be further extended by examining how other attributes of earnings quality, such as timely loss recognition and earnings conservatism are associated with the tone. Second, there is a vast and growing literature on earnings management and real activities manipulation. It is therefore interesting to examine how the tone is associated with earnings management activities. Third, how other linguistic features such as attributions of financial performance, rhetorical or thematic manipulation, etc. are associated with the tone is also an interesting avenue for additional research. Finally, while this study finds that tone has positive association with earnings persistence, Li (2008) finds that more readable annual reports have higher earnings persistence. Therefore, future research can examine the joint effect of tone and readability on the persistence of earnings.

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Table 1
Sample Selection

Panel A: Firm Sample	
Firms in FTSE All-Share Index on 30 June 2008	668
Less: Financial Firms	(305)
FTSE All-Share Index Non-Financial Firms on 30 June 2008	363
Less: Non-Financial Firms releasing Quarterly Statements in 2008	(39)
FTSE All-Share Index Non-Financial Firms disclosing IMS in 2008	**324**
Randomly Selected Non-Financial Firms from 30 June 2008	**100**

Panel B: IMS Sample	
Total Number of Firms	100
Maximum Possible IMS from Sample Firms	1200
Less: Firms delisted	(69)
Less: Maximum number of IMS not disclosed	(109)
Add: IMS misclassified in the Perfect Information Navigator	16
Final Sample of IMSs	**1038**

Panel C: Year Composition of IMS	OBS	%
2008	179	17.24%
2009	198	19.08%
2010	189	18.21%
2011	171	16.47%
2012	153	14.74%
2013	148	14.26%
Total	**1038**	100.00%

Panel D: Industry Composition of IMS	OBS	%
ICB 0001 Oil and Gas	48	4.62%
ICB 1000 Basic Materials	72	6.94%
ICB 2000 Industrials	279	26.88%
ICB 3000 Consumer Goods	132	12.72%
ICB 4000 Healthcare	24	2.31%
ICB 5000 Consumer Services	313	30.15%
ICB 6000 Telecommunications	60	5.78%
ICB 7000 Utilities	24	2.31%
ICB 9000 Technology	86	8.29%
Total	**1038**	100.00%

Notes: The table illustrates the sample selection procedure. The sampling period spans six years namely 2008–2013. 2008 is used as the year of initiating the sampling process. The table presents firm sample (Panel A), IMS sample (Panel B), year composition of IMS in the sample (Panel C) and industry composition of IMS in the sample (Panel D). OBS: number of observations.

Table 2
Descriptive Statistics and Correlations

Panel A: Descriptive Statistics

Variable	Mean	Std. Dev	Minimum	Median	Maximum
TONE	0.25	0.43	–1.00	0.27	1.00
POS	0.25	0.14	0.00	0.23	0.82
NEG	0.14	0.10	0.00	0.13	0.56
EARN	0.10	0.09	–0.09	0.08	0.58
CFO	0.04	0.16	–0.33	0.05	1.56
ACC	–0.03	0.08	–0.95	–0.02	0.26
ABSACC	0.05	0.07	0.00	0.04	0.95
RET	0.13	0.54	–0.85	0.00	3.93
SIZE	17.7	1.66	10.4	17.6	22.6
BTM	0.60	1.19	–12.5	0.49	25.0
STDRET	0.70	5.68	0.00	0.35	176
STDEARN	0.04	0.09	0.00	0.02	1.59
HITECH	0.07	0.25	0.00	0.00	1.00
LOSS	0.14	0.34	0.00	0.00	1.00
AGE	1.72	0.25	0.95	1.75	2.20
BUSSEG	0.77	0.30	0.30	0.78	1.28
GEOSEG	0.70	0.31	0.30	0.78	1.81
DIV	0.85	0.36	0.00	1.00	1.00

Panel B: Spearman's Rank Correlations for Tone and Earnings

	TONE	POS	NEG	EARN
TONE	1.000			
POS	0.640***	1.000		
NEG	–0.730***	–0.061**	1.000	
EARN	0.146***	0.202***	–0.039	1.000
CFO	0.041	0.125***	0.050	0.195***
ACC	–0.011	0.045	0.048	–0.083***
ABSACC	–0.038	–0.101***	–0.040	0.081***
RET	0.209***	0.163***	–0.160***	0.237***
SIZE	0.121***	0.170***	–0.020	0.262***
BTM	–0.076***	–0.074***	–0.052	–0.333***
STDRET	0.094***	0.073**	–0.060*	0.438***
STDEARN	0.028	0.032	–0.017	0.604***
HITECH	–0.025	–0.003	0.027	–0.085***
LOSS	–0.081***	–0.193***	–0.059*	–0.328***
AGE	0.012	0.056**	0.013	–0.204***
BUSSEG	–0.004	0.029	0.022	0.133***
GEOSEG	0.014	–0.127***	–0.098***	0.041
DIV	0.032	0.217***	0.111***	0.331***

Notes: The table presents summary statistics of variables used in this study from 1038 IMSs during the period 2008–2013 in Panel A and Spearman's rank correlations of TONE, POS, NEG and EARN with the other variables used in the study in Panel B. In both panels, TONE, POS and NEG are shown prior to standardization. Std. Dev = Standard Deviation. All variables are defined as in Appendix.
*** Two-tailed significance at the 1% level.
** Two-tailed significance at the 5% level.
* Two-tailed significance at the 10% level.

Table 3
Tone, Positivity, Negativity and the Persistence of Earnings

	Dependent Variable			
	$EARN_{it+1j}$	$EARN_{it+2j}$	$EARN_{it+1j}$	$EARN_{it+2j}$
Panel A: Tone and Earnings Persistence				
Variable	(1) Coeff.	(2) Coeff.	(3) Coeff.	(4) Coeff.
INTERCEPT	–0.0046	0.0142*	–0.0045	0.0138*
$TONE_{itj}$	–0.0011	–0.0016	–0.0007	0.0014
$EARN_{itj}$	0.8410***	0.7447***	0.8410***	0.7514***
$TONE_{itj} \times EARN_{itj}$	0.0736**	0.0576**	0.0720**	0.0576**
$TONE_{itj} \times EARN_{itj} \times HITECH_{itj}$			–0.0636**	–0.0217
$TONE_{itj} \times HITECH_{itj}$			–0.0017	–0.0050
$HITECH_{itj}$			–0.0009	0.0088
$HITECH_{itj} \times EARN_{itj}$			–0.0413	–0.2895**
YEAR FE	YES	YES	YES	YES
F-VALUE	335.32***	157.82***	223.40***	106.36***
ADJ R-SQ	0.7191	0.5456	0.7186	0.5475
OBS	1038	1038	1038	1038
Panel B: Positivity, Negativity and Earnings Persistence				
Variable	(5) Coeff.	(6) Coeff.	(7) Coeff.	(8) Coeff.
INTERCEPT	–0.0033	0.0157*	–0.0032	0.0154
POS_{itj}	0.0047**	0.0046*	0.0050**	0.0051*
NEG_{itj}	0.0064*	0.0074*	0.0063*	0.0077*
$EARN_{itj}$	0.8386***	0.7418***	0.8381***	0.7478
$POS_{itj} \times EARN_{itj}$	–0.0268	0.0017	–0.0302	–0.0036
$NEG_{itj} \times EARN_{itj}$	–0.1128**	–0.0774*	–0.1161**	–0.0780*
$POS_{itj} \times EARN_{itj} \times HITECH_{itj}$			0.1231***	0.0947
$NEG_{itj} \times EARN_{itj} \times HITECH_{itj}$			0.1115**	0.0461
$POS_{itj} \times HITECH_{itj}$			–0.0089***	–0.0117*
$NEG_{itj} \times HITECH_{itj}$			–0.0051	–0.0054
$HITECH_{itj}$			–0.0019	0.0082
$HITECH_{itj} \times EARN_{itj}$			–0.0184	–0.2668
YEAR FE	YES	YES	YES	YES
F-VALUE	278.24***	128.25***	173.59***	80.79***
ADJ R-SQ	0.7263	0.5491	0.7255	0.5499
OBS	1038	1038	1038	1038

Notes: The table reports the effect of tone on earnings persistence with regressions of one-year and two-year ahead earnings on TONE × EARN of 1038 IMSs during the period 2008—2013. TONE is standardized to have a mean of 0 and standard deviation of 1. YEAR FE includes five 1/0 indicator variables for each year in sample, omitting the year 2008. P-values are based on standard errors clustered two-way at the industry-level and year-level. Clustering of industry is performed by 4-digit ICB classification codes for industries as follows: 0001 – Oil and Gas, 1000 – Basic Materials, 2000 – Industrials, 3000 – Consumer Goods, 4000 – Healthcare, 5000 – Consumer Services, 6000 – Telecommunications, 7000 – Utilities, 9000 – Technology. Clustering of year is performed by the year name. OBS: number of observations. All variables are defined in Appendix.

*** Two-tailed significance at the 1% level.

** Two-tailed significance at the 5% level.

* Two-tailed significance at the 10% level.

Table 4
Tone and the Persistence of Earnings: Cash Flow and Accruals Components

	Dependent Variable			
	$EARN_{it+1j}$	$EARN_{it+2j}$	$EARN_{it+1j}$	$EARN_{it+2j}$
	(1)	(2)	(3)	(4)
Variable	Coeff.	Coeff.	Coeff.	Coeff.
INTERCEPT	–0.0056	0.0139*	–0.0062	0.0125
$TONE_{itj}$	–0.0008	–0.0001	–0.0003	0.0004
CFO_{itj}	0.8409***	0.7451***	0.8417***	0.7531***
$TONE_{itj} \times CFO_{itj}$	0.0678**	0.0525**	0.0672**	0.0496**
ACC_{itj}	0.7851***	0.7210***	0.7803***	0.7167***
$TONE_{itj} \times ACC_{itj}$	0.0677**	0.0827***	0.0678**	0.0810**
$TONE_{itj} \times CFO_{itj} \times HITECH_{itj}$			–0.0811**	–0.0147
$TONE_{itj} \times ACC_{itj} \times HITECH_{itj}$			–0.2219***	–0.0743*
$TONE_{itj} \times HITECH_{itj}$			–0.0139***	–0.0154***
$HITECH_{itj}$			0.0060*	0.0205*
$HITECH_{itj} \times CFO_{itj}$			–0.0227	–0.2954***
$HITECH_{itj} \times ACC_{itj}$			0.1105*	–0.0501
YEAR FE	YES	YES	YES	YES
F-VALUE	266.11***	124.76***	167.06***	79.53***
ADJ R-SQ	0.7188	0.5441	0.7193	0.5478
OBS	1038	1038	1038	1038

Notes: The table reports the effect of tone on earnings persistence with regressions of one-year and two-year ahead earnings on TONE × CFO and TONE × ACC of 1038 IMSs during the period 2008—2013. TONE is standardized to have a mean of 0 and standard deviation of 1. YEAR FE includes five 1/0 indicator variables for each year in sample, omitting the year 2008. P-values are based on standard errors clustered two-way at the industry-level and year-level. Clustering of industry is performed by 4-digit ICB classification codes for industries as follows: 0001 – Oil and Gas, 1000 – Basic Materials, 2000 – Industrials, 3000 – Consumer Goods, 4000 – Healthcare, 5000 – Consumer Services, 6000 – Telecommunications, 7000 – Utilities, 9000 – Technology. Clustering of year is performed by the year name. OBS: number of observations. All variables are defined in Appendix.
*** Two-tailed significance at the 1% level.
** Two-tailed significance at the 5% level.
* Two-tailed significance at the 10% level.

Table 5
Positivity, Negativity and the Persistence of Earnings: Cash Flow and Accruals Components

	Dependent Variable			
	$EARN_{it+1j}$	$EARN_{it+2j}$	$EARN_{it+1j}$	$EARN_{it+2j}$
Variable	(1) Coeff.	(2) Coeff.	(3) Coeff.	(4) Coeff.
INTERCEPT	–0.0040	0.0155*	–0.0045	0.0142
POS_{itj}	0.0057***	0.0059*	0.0059***	0.0060*
NEG_{itj}	0.0070**	0.0074**	0.0066**	0.0072*
CFO_{itj}	0.8376***	0.7412***	0.8377***	0.7484***
$POS_{itj} \times CFO_{itj}$	–0.0274	0.0009	–0.0315	–0.0051
$NEG_{itj} \times CFO_{itj}$	–0.1119**	–0.0753*	–0.1129**	–0.0717*
ACC_{itj}	0.7879***	0.7131***	0.7807***	0.7039***
$POS_{itj} \times ACC_{itj}$	–0.0064	0.0340	–0.0198	0.0125
$NEG_{itj} \times ACC_{itj}$	–0.0961*	–0.0701	–0.1002*	–0.0737
$POS_{itj} \times CFO_{itj} \times HITECH_{itj}$			0.1392***	0.1353**
$NEG_{itj} \times CFO_{itj} \times HITECH_{itj}$			0.2115***	0.1351**
$POS_{itj} \times ACC_{itj} \times HITECH_{itj}$			0.3516***	0.4609***
$NEG_{itj} \times ACC_{itj} \times HITECH_{itj}$			0.5563***	0.4777***
$POS_{itj} \times HITECH_{itj}$			–0.0063***	–0.0056
$NEG_{itj} \times HITECH_{itj}$			0.0171***	0.0192***
$HITECH_{itj}$			0.0103**	0.0257*
$HITECH_{itj} \times CFO_{itj}$			0.0514	–0.2070**
$HITECH_{itj} \times ACC_{itj}$			0.2456***	0.1008
YEAR FE	YES	YES	YES	YES
F-VALUE	212.13***	97.15***	127.27***	59.09***
ADJ R-SQ	0.7258	0.5465	0.7282	0.5520
OBS	1038	1038	1038	1038

Notes: The table reports the effect of tone on earnings persistence with regressions of one-year and two-year ahead earnings on POS × CFO, POS × ACC, NEG × CFO and NEG × ACC of 1038 IMSs during the period 2008—2013. TONE is standardized to have a mean of 0 and standard deviation of 1. YEAR FE includes five 1/0 indicator variables for each year in sample, omitting the year 2008. P-values are based on standard errors clustered two-way at the industry-level and year-level. Clustering of industry is performed by 4-digit ICB classification codes for industries as follows: 0001 – Oil and Gas, 1000 – Basic Materials, 2000 – Industrials, 3000 – Consumer Goods, 4000 – Healthcare, 5000 – Consumer Services, 6000 – Telecommunications, 7000 – Utilities, 9000 – Technology. Clustering of year is performed by the year name. OBS: number of observations. All variables are defined in Appendix.
*** Two-tailed significance at the 1% level.
** Two-tailed significance at the 5% level.
* Two-tailed significance at the 10% level.

Table 6
The Predictive Ability of Tone, Positivity, Negativity and Current Earnings for Future Earnings

	Dependent Variable			
	$EARN_{it+1j}$	$EARN_{it+2j}$	$EARN_{it+1j}$	$EARN_{it+2j}$
	(1)	(2)	(3)	(4)
Variable	Coeff.	Coeff.	Coeff.	Coeff.
INTERCEPT	–0.0230	–0.0015	–0.0239	0.0056
$TONE_{itj}$	0.0052***	0.0040*		
POS_{itj}			0.0022	0.0053*
NEG_{itj}			–0.0041**	–0.0001
$EARN_{itj}$	0.7994***	0.7027***	0.8007***	0.7024***
$HITECH_{itj}$	–0.0039	–0.0076	–0.0038	–0.0075
$ABSACC_{itj}$	0.0430*	0.0268	0.0434*	0.0265
$SIZE_{itj}$	0.0015	0.0003	0.0015	0.0001
BTM_{itj}	–0.0028	–0.0015	–0.0027	–0.0019
RET_{itj}	0.0057	–0.0041	0.0056	–0.0039
$STDRET_{itj}$	0.0000	0.0000	0.0000	0.0000
$STDEARN_{itj}$	0.0150	0.0564	0.0153	0.0544
AGE_{itj}	–0.0083	–0.0062	–0.0087	–0.0070
$BUSSEG_{itj}$	0.0023	–0.0009	0.0024	–0.0011
$GEOSEG_{itj}$	0.0021	0.0129	0.0021	0.0152*
DIV_{itj}	0.0077**	0.0141***	0.0077**	0.0112**
YEAR FE	YES	YES	YES	YES
F-VALUE	144.49***	70.00***	136.55***	66.61***
ADJ R-SQ	0.7135	0.5450	0.7129	0.5459
OBS	1038	1038	1038	1038

Notes: The table reports the predicative ability of TONE, POS and NEG for future earnings with regressions of one-year and two-year ahead earnings on TONE, POS and NEG of 1038 IMSs during the period 2008—2013. TONE, POS and NEG are standardized to have a mean of 0 and standard deviation of 1. YEAR FE includes five 1/0 indicator variables for each year in sample, omitting the year 2008. P-values are based on standard errors clustered two-way at the industry-level and year-level. Clustering of industry is performed by 4-digit ICB classification codes for industries as follows: 0001 – Oil and Gas, 1000 – Basic Materials, 2000 – Industrials, 3000 – Consumer Goods, 4000 – Healthcare, 5000 – Consumer Services, 6000 – Telecommunications, 7000 – Utilities, 9000 – Technology. Clustering of year is performed by the year name. OBS: number of observations. All variables are defined in Appendix.
*** Two-tailed significance at the 1% level.
** Two-tailed significance at the 5% level.
* Two-tailed significance at the 10% level.

Table 7
Tone and the Persistence of Earnings: Full Model

	Dependent Variable			
	$EARN_{it+1j}$	$EARN_{it+2j}$	$EARN_{it+1j}$	$EARN_{it+2j}$
Variable	(1) Coeff.	(2) Coeff.	(3) Coeff.	(4) Coeff.
INTERCEPT	–0.0670	–0.0469	–0.0669	–0.0474
$TONE_{itj}$	0.0010	–0.0006	0.0018*	0.0001
$EARN_{itj}$	1.3287***	1.2518***	1.3363***	1.2564***
$TONE_{itj} \times EARN_{itj}$	0.0501***	0.0488**	0.0478***	0.0447**
$TONE_{itj} \times EARN_{itj} \times HITECH_{itj}$			0.0454	0.1118
$TONE_{itj} \times HITECH_{itj}$			–0.0122***	–0.0150***
$HITECH_{itj}$	–0.0020	0.0039	–0.0008	0.0056
$HITECH_{itj} \times EARN_{itj}$	–0.0159	–0.0804	–0.0447	–0.1045
$ABSACC_{itj}$	0.1013	0.0953*	0.1015	0.0952*
$ABSACC_{itj} \times EARN_{itj}$	–0.7857	–1.3877**	–0.8063	–1.3810**
$SIZE_{itj}$	0.0004	0.0001	0.0002	–0.0001
$SIZE_{itj} \times EARN_{itj}$	0.0039	0.0090	0.0051	–0.0083
BTM_{itj}	–0.0038	–0.0068	–0.0039	–0.0070
$BTM_{itj} \times EARN_{itj}$	0.0847	0.1033	0.0849	0.1043
RET_{itj}	–0.0061	0.0042	–0.0058	0.0045
$RET_{itj} \times EARN_{itj}$	0.0779**	0.0564	0.0767**	0.0572
$STDRET_{itj}$	0.0005	0.0002	0.0005	0.0002
$STDRET_{itj} \times EARN_{itj}$	–0.0071	–0.0028	–0.0069	–0.0027
$STDEARN_{itj}$	0.0708	0.0546	0.0697	0.0544
$STDEARN_{itj} \times EARN_{itj}$	–0.3889	0.1358	–0.3817	0.1361
AGE_{itj}	0.0084	0.0022	0.0102	0.0042
$AGE_{itj} \times EARN_{itj}$	–0.1541	–0.0560	–0.1622*	–0.0702
$BUSSEG_{itj}$	0.0310**	0.0472***	0.0311**	0.0475***
$BUSSEG_{itj} \times EARN_{itj}$	–0.3028***	–0.5131***	–0.3032***	–0.5136***
$GEOSEG_{itj}$	0.0040	0.0077	0.0036	0.0072
$GEOSEG_{itj} \times EARN_{itj}$	0.0551	0.1518*	0.0581	0.1574**
DIV_{itj}	0.0150*	0.0094	0.0154*	0.0096
$DIV_{itj} \times EARN_{itj}$	–0.1259	0.0511	–0.1435	0.0511
YEAR FE	YES	YES	YES	YES
F-VALUE	97.26***	48.17***	91.27***	45.16***
ADJ R-SQ	0.7358	0.5771	0.7358	0.5767
OBS	1038	1038	1038	1038

Notes: The table reports the effect of tone on earnings persistence with regressions of one-year and two-year ahead earnings on TONE × EARN of 1038 IMSs during the period 2008—2013. The determinants of TONE and their interaction terms with EARN are included in the models. TONE is standardized to have a mean of 0 and standard deviation of 1. YEAR FE includes five 1/0 indicator variables for each year in sample, omitting the year 2008. P-values are based on standard errors clustered two-way at the industry-level and year-level. Clustering of industry is performed by 4-digit ICB classification codes for industries as follows: 0001 – Oil and Gas, 1000 – Basic Materials, 2000 – Industrials, 3000 – Consumer Goods, 4000 – Healthcare, 5000 – Consumer Services, 6000 – Telecommunications, 7000 – Utilities, 9000 – Technology. Clustering of year is performed by the year name. OBS: number of observations. All variables are defined in Appendix.
*** Two-tailed significance at the 1% level.
** Two-tailed significance at the 5% level.
* Two-tailed significance at the 10% level.

Table 8
Positivity, Negativity and the Persistence of Earnings: Full Model

	Dependent Variable			
	$EARN_{it+1j}$	$EARN_{it+2j}$	$EARN_{it+1j}$	$EARN_{it+2j}$
	(1)	(2)	(3)	(4)
Variable	Coeff.	Coeff.	Coeff.	Coeff.
INTERCEPT	–0.0620	–0.0398	–0.0612	–0.0409
POS_{itj}	0.0039**	0.0040	0.0045**	0.0048*
NEG_{itj}	0.0031**	0.0044*	0.0027*	0.0049*
$EARN_{itj}$	1.2706***	1.2342***	1.2747***	1.2377***
$POS_{itj} \times EARN_{itj}$	–0.0123	0.0104	–0.0172	0.0051
$NEG_{itj} \times EARN_{itj}$	–0.0787***	–0.0557	–0.0781***	–0.0528
$POS_{itj} \times EARN_{itj} \times HITECH_{itj}$			0.1888***	0.1967**
$NEG_{itj} \times EARN_{itj} \times HITECH_{itj}$			–0.0448	–0.0300
$POS_{itj} \times HITECH_{itj}$			–0.0154***	–0.0184**
$NEG_{itj} \times HITECH_{itj}$			–0.0004	–0.0013
$HITECH_{itj}$	–0.0025	0.0039	–0.0013	0.0067
$HITECH_{itj} \times EARN_{itj}$	0.0002	–0.0755	–0.0022	–0.0601
$ABSACC_{itj}$	0.0940	0.0906*	0.0959	0.0930*
$ABSACC_{itj} \times EARN_{itj}$	–0.6642	–1.3035**	–0.7051	–1.2916**
$SIZE_{itj}$	0.0005	–0.0001	0.0003	–0.0020
$SIZE_{itj} \times EARN_{itj}$	0.0038	–0.0085	0.0046	–0.0084
BTM_{itj}	–0.0039	–0.0075	–0.0040	–0.0077
$BTM_{itj} \times EARN_{itj}$	0.0728	0.1018	0.0718	0.1038
RET_{itj}	–0.0056	0.0043	–0.0055	0.0046
$RET_{itj} \times EARN_{itj}$	0.0724*	–0.0565	0.0725*	–0.0558
$STDRET_{itj}$	0.0005	0.0002	0.0005	0.0002
$STDRET_{itj} \times EARN_{itj}$	–0.0071	–0.0030	–0.0067	–0.0026
$STDEARN_{itj}$	0.0649	0.0494	0.0634	0.0498
$STDEARN_{itj} \times EARN_{itj}$	–0.3428	0.1646	–0.3271	0.1596
AGE_{itj}	0.0071	0.0022	0.0077	0.0031
$AGE_{itj} \times EARN_{itj}$	–0.1398	–0.0580	–0.1387	–0.0694
$BUSSEG_{itj}$	0.0291***	0.0456***	0.0297***	0.0463***
$BUSSEG_{itj} \times EARN_{itj}$	–0.2925***	–0.5050***	–0.2967***	–0.5076***
$GEOSEG_{itj}$	0.0067	0.0123	0.0064	0.0123
$GEOSEG_{itj} \times EARN_{itj}$	0.0336	0.1315*	0.0355	0.1374*
DIV_{itj}	0.0112	0.0055	0.0122	0.0058
$DIV_{itj} \times EARN_{itj}$	–0.0823	0.0667	–0.1018	0.0762
YEAR FE	YES	YES	YES	YES
F-VALUE	92.47***	45.46***	82.13***	40.40***
ADJ R-SQ	0.7384	0.5784	0.7380	0.5777
OBS	1038	1038	1038	1038

Notes: The table reports the effect of positivity and negativity on earnings persistence with regressions of one-year and two-year ahead earnings on POS × EARN and NEG × EARN of 1038 IMSs during the period 2008—2013. The determinants of POS and NEG, and their interaction terms with EARN are included in the models. POS and NEG are standardized to have a mean of 0 and standard deviation of 1. YEAR FE includes five 1/0 indicator variables for each year in sample, omitting the year 2008. P-values are based on standard errors clustered two-way at the industry-level and year-level. Clustering of industry is performed by 4-digit ICB classification codes for industries as follows: 0001 – Oil and Gas, 1000 – Basic Materials, 2000 – Industrials, 3000 – Consumer Goods, 4000 – Healthcare, 5000 – Consumer Services, 6000 – Telecommunications, 7000 – Utilities, 9000 – Technology. Clustering of year is performed by the year name. OBS: number of observations. All variables are defined in Appendix.
*** Two-tailed significance at the 1% level.
** Two-tailed significance at the 5% level.
* Two-tailed significance at the 10% level.

Table 9
Tone and the Persistence of Profits and Losses

	PROFIT FIRMS		LOSS FIRMS	
	$EARN_{it+1j}$	$EARN_{it+2j}$	$EARN_{it+1j}$	$EARN_{it+2j}$
Panel A: Effect on Technology and Non-Technology Firms Not Separated				
Variable	(1) Coeff.	(2) Coeff.	(3) Coeff.	(4) Coeff.
INTERCEPT	–0.0614	–0.0197	–0.0097	0.0543
$TONE_{itj}$	0.0025**	0.0018	0.0029	0.0023
$EARN_{itj}$	1.1155**	1.0006*	0.0164	–2.4464
$TONE_{itj} \times EARN_{itj}$	0.0396**	0.0379**	0.0098	0.0408
$HITECH_{itj}$	–0.0120	–0.0054	–0.1274	–0.2753*
$HITECH_{itj} \times EARN_{itj}$	0.0545	0.0090	4.3989	8.1038**
CONTROL VARIABLES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES
F-VALUE	78.47***	40.74***	23.92***	20.41***
ADJ R-SQ	0.7195	0.5682	0.8410	0.8175
OBS	895	895	143	143
Panel B: Effect on Technology and Non-Technology Firms Separated				
Variable	(5) Coeff.	(6) Coeff.	(7) Coeff.	(8) Coeff.
INTERCEPT	–0.0626	–0.0208	–0.0099	0.0541
$TONE_{itj}$	0.0031***	0.0026	0.0029	0.0023
$EARN_{itj}$	1.1317**	1.0096*	0.0011	–2.4583
$TONE_{itj} \times EARN_{itj}$	0.0373**	0.0335**	0.0105	0.0414
$TONE_{itj} \times EARN_{itj} \times HITECH_{itj}$	0.0351	0.1038**	–0.2343	–0.1479
$TONE_{itj} \times HITECH_{itj}$	–0.0074**	–0.0125***	0.0024	0.0006
$HITECH_{itj}$	–0.0107	–0.0031	–0.1153	–0.2663
$HITECH_{itj} \times EARN_{itj}$	0.0343	–0.0126	3.8913	7.7195
CONTROL VARIABLES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES
F-VALUE	73.46***	38.15***	22.00***	18.76***
ADJ R-SQ	0.7190	0.5675	0.8379	0.8138
OBS	895	895	143	143

Notes: The table reports the effect of tone on the persistence of profits and losses with regressions of one-year and two-year ahead earnings on TONE × EARN of 895 IMSs of profit firms and 143 IMSs of loss firms during the period 2008—2013. TONE is standardized to have a mean of 0 and standard deviation of 1. CONTROL VARIABLES include ABSACC, SIZE, BTM, RET, STDRET, STDEARN, AGE, BUSSEG, GEOSEG, DIV, and the interaction terms between each of these variables and EARN. YEAR FE includes five 1/0 indicator variables for each year in sample, omitting the year 2008. P-values are based on standard errors clustered two-way at the industry-level and year-level. Clustering of industry is performed by 4-digit ICB classification codes for industries as follows: 0001 – Oil and Gas, 1000 – Basic Materials, 2000 – Industrials, 3000 – Consumer Goods, 4000 – Healthcare, 5000 – Consumer Services, 6000 – Telecommunications, 7000 – Utilities, 9000 – Technology. Clustering of year is performed by the year name. OBS: number of observations. All variables are defined in Appendix.
*** Two-tailed significance at the 1% level.
** Two-tailed significance at the 5% level.
* Two-tailed significance at the 10% level.

Table 10
Positivity, Negativity and the Persistence of Profits and Losses

	PROFIT FIRMS		LOSS FIRMS	
	$EARN_{it+1j}$	$EARN_{it+2j}$	$EARN_{it+1j}$	$EARN_{it+2j}$
Panel A: Effect on Technology and Non-Technology Firms Not Separated				
Variable	(1) Coeff.	(2) Coeff.	(3) Coeff.	(4) Coeff.
INTERCEPT	–0.0619	–0.0225	–0.0144	0.0508
POS_{itj}	0.0051***	0.0071**	–0.0001	–0.0002
NEG_{itj}	0.0036***	0.0059**	–0.0036**	–0.0026
$EARN_{itj}$	1.1202**	1.0754**	–1.1018	–4.2511
$POS_{itj} \times EARN_{itj}$	–0.0210	–0.0090	–0.0567	–0.0803
$NEG_{itj} \times EARN_{itj}$	–0.0804***	–0.0654*	–0.0430	–0.0948
$HITECH_{itj}$	–0.0121	–0.0047	–0.1079	–0.2444
$HITECH_{itj} \times EARN_{itj}$	0.0679	0.0062	3.9174	7.3820*
CONTROL VARIABLES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES
F-VALUE	74.56***	38.58***	23.03***	19.39***
ADJ R-SQ	0.7221	0.5706	0.8443	0.8191
OBS	895	895	143	143
Panel B: Effect on Technology and Non-Technology Firms Separated				
Variable	(5) Coeff.	(6) Coeff.	(7) Coeff.	(8) Coeff.
INTERCEPT	–0.0642	–0.0250	–0.0150	0.0502
POS_{itj}	0.0056***	0.0076**	–0.0001	–0.0002
NEG_{itj}	0.0037**	0.0061**	–0.0037**	–0.0027
$EARN_{itj}$	1.1427**	1.0801**	–1.3081	–4.4689
$POS_{itj} \times EARN_{itj}$	–0.0249	–0.0124	–0.0656	–0.0897
$NEG_{itj} \times EARN_{itj}$	–0.0807***	–0.0632*	–0.0504	–0.1026
$POS_{itj} \times EARN_{itj} \times HITECH_{itj}$	0.1518**	0.1301**	–3.8788	–11.331
$NEG_{itj} \times EARN_{itj} \times HITECH_{itj}$	0.0492	–0.0502	0.0238	–2.6374
$POS_{itj} \times HITECH_{itj}$	–0.0107**	–0.0105**	0.1142	0.4076
$NEG_{itj} \times HITECH_{itj}$	–0.0050	–0.0004	0.0100	0.1151
$HITECH_{itj}$	–0.0110	–0.0033	0.0070	0.0105
$HITECH_{itj} \times EARN_{itj}$	0.0759	0.0265	–0.0199	–0.0089
CONTROL VARIABLES	YES	YES	YES	YES
YEAR FE	YES	YES	YES	YES
F-VALUE	66.06***	34.23***	21.38***	17.95***
ADJ R-SQ	0.7211	0.5690	0.8420	0.8159
OBS	895	895	143	143

Notes: The table reports the effect of positivity and negativity on the persistence of profits and losses with regressions of one-year and two-year ahead earnings on POS × EARN and NEG × EARN of 895 IMSs of profit firms and 143 IMSs of loss firms during the period 2008—2013. POS and NEG are standardized to have a mean of 0 and standard deviation of 1. CONTROL VARIABLES include ABSACC, SIZE, BTM, RET, STDRET, STDEARN, AGE, BUSSEG, GEOSEG, DIV, and the interaction terms between each of these variables and EARN. YEAR FE includes five 1/0 indicator variables for each year in sample, omitting the year 2008. P-values are based on standard errors clustered two-way at the industry-level and year-level. Clustering of industry is performed by 4-digit ICB classification codes for industries as follows: 0001 – Oil and Gas, 1000 – Basic Materials, 2000 – Industrials, 3000 – Consumer Goods, 4000 – Healthcare, 5000 – Consumer Services, 6000 – Telecommunications, 7000 – Utilities, 9000 – Technology. Clustering of year is performed by the year name. OBS: number of observations. All variables are defined in Appendix.
*** Two-tailed significance at the 1% level.
** Two-tailed significance at the 5% level.
* Two-tailed significance at the 10% level.

Appendix
Variable Definitions

Variable	Definition
TONE	The net tone score computed as the difference between the number of positive and negative statements in an IMS divided by the sum of positive and negative statements in the IMS.
POS	The positivity score computed as the number of positive statements in an IMS divided by the total number of statements in the IMS.
NEG	The negativity score computed as the number of negative statements in an IMS divided by the total number of statements in the IMS.
EARN	Earnings before extraordinary items divided by beginning total assets.
CFO	Cash flow from operations, net of extraordinary items and discontinued operations, divided by beginning total assets.
ACC	Total accruals, computed by deducting cash flow from operations (net of extraordinary items and discontinued operations) from income before extraordinary items, divided by beginning total assets.
ABSACC	The absolute value of total accruals.
RET	Annual buy-and-hold raw returns.
EARN	Earnings before extraordinary items divided by beginning total assets.
STDEARN	Standard deviation of EARN over the past four years.
STDRET	Standard deviation of RET over the last four years.
SIZE	Natural logarithm of market value of equity.
BTM	Book-to-market value of equity.
HITECH	Indicator variable taking the value of 1 if the firm has ICB Industry Classification Code 9000 – Technology, and 0 otherwise.
LOSS	Indicator variable taking the value of 1 if EARN is negative, and 0 otherwise.
AGE	Natural logarithm of (1 + number of years since the firm appears in DataStream).
BUSSEG	Natural logarithm of (1 + number of business segments).
GEOSEG	Natural logarithm of (1 + number of geographic segments).
DIV	Indicator variable taking the value of 1 if the firm paid dividends and 0 otherwise.